Citation:

Meadows E, Le Saux N. A systematic review of the effectiveness of antimicrobial rinse-free hand sanitizers for prevention of illness-related absenteeism in elementary school children. *BMC Public Health.* 2004 Nov 1; 4: 50.

PubMed ID: 15518593

Study Design:

Systematic review

Class:

M - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To determine whether antimicrobial rinse-free hand sanitizer interventions are effective in preventing illness-related absenteeism in elementary school children.

Inclusion Criteria:

Studies were evaluated for inclusion on the basis of the following four criteria:

- **Target Population:** Elementary school children, ages four-12 years/K-8
- **Intervention:** Antimicrobial, rinse-free hand sanitizer vs. no intervention or placebo
- **Outcome:** Absences due to communicable diseases
- **Study Design:** Cluster randomized controlled trials and cluster non-randomized controlled trials (regardless of publication status).

Exclusion Criteria:

Studies that did not meet the inclusion criteria described above were omitted.

Description of Study Protocol:

Recruitment

Six databases were searched:

- Biological abstracts (1990 to May 2003)
- CINAHL (1982 to 2003)
- Cochrane Controlled Trials Register (1981 to 2003)
- EMBASE (1980 to May 2003)
- HealthSTAR (1975 to May 2003)

- MEDLINE (1966 to May 2003).

Hand searches were conducted by:

- Contacting authors, experts and companies that manufacture antimicrobial hand gels
- Searching conference proceedings for the *American Journal of Infection Control* (2000-2004) and recently published issues of the *American Journal of Infection Control* (Feb 2003-Aug 2004)
- Looking at bibliographies from review articles.

Design

Only reviewer completed the initial screen of articles.

Two reviewers independently abstracted data from all studies, including information regarding:

- Descriptive details of studies (e.g., year published, language)
- Design
- Population
- Intervention
- Primary outcome.

The two reviewers independently assessed the quality of each included study using the previously validated three-item Jadad scale, which assesses quality in terms of randomization generation, double-blinding and withdrawals and drop-outs in the intervention group. If studies were randomized, allocation concealment was assessed.

- Reviewers resolved differences by means of open consensus
- Only one reviewer reviewed the two citations identified after September 2003.

Blinding used

The screening was completed in an unblinded manner. There is inconclusive evidence that blinding introduced bias into the process.

Statistical Analysis

- Data synthesis and analysis was performed in accordance with the Cochrane Reviewers' Handbook. Data were first synthesized to determine the overall pattern of studies regarding design, population, intervention and outcome characteristics.
- Clinical and statistical differences were identified and examined
- Percent relative differences were presented with 95% confidence intervals were calculated, enabling the results to be compared between studies, without altering the measure of association reported in the studies (rate and risk ratios)
- In studies were data could not be abstracted, measures of association were reported
- Due to differences in the studies, a quantitative synthesis was deemed not appropriate.

Data Collection Summary:

Timing of Measurements

Varied between studies

Dependent Variables

- Use of antimicrobial, rinse-free hand sanitizer
- Education on germs and hygiene (provision varied between studies).

Independent Variables

Absenteeism due to communicable disease

Control Variables

None noted

Description of Actual Data Sample:

- ***Initial N****:* 211
  - 211 studies identified via electronic searches; -70 duplicate records removed
  - 141 records identified for initial screening; -123 excluded (two for type of study, 121 excluded due to intervention type, outcome, or overall non-relevance)
  - 18 potentially eligible studies identified; plus seven studies identified via hand searches
  - 25; -21 failed to meet inclusion criteria
  - Four eligible studies; plus two eligible studies identified after manuscript submission
  - Six total studies included
- ***Attrition (final N):*** Six
- ***Age****:* Elementary school children ages four to 12 years; K-8 grades
- ***Ethnicity****:* No information provided
- ***Other relevant demographics****:* No information provided
- ***Anthropometrics:*** No information provided
- ***Location:*** United States.

Summary of Results:

Key Findings

- All six studies found a statistically significant impact of the rinse-free antimicrobial hand sanitizers at reducing school absenteeism due to communicable diseases (absenteeism reduction range: 20%-56%)
- Trials varied with respect to intervention, including germ and hygiene education that was provided with sanitizer
- Four studies used an alcohol-based product, two used a benzalkonium chloride disinfectant, which the FDA has indicated that sufficient data exists to classify the latter compounds as safe and effective to use as antiseptic handwashes. They are also adversely affected in the presence of organic materials (e.g., food residues), which may be an issue in schools.
- Quality of reporting detail was low, including randomization and blinding procedures, withdrawals and drop-outs, sample size calculations and statistical methods.

Author Conclusion:

- All studies reported significant effects of the antimicrobial rinse-free hand gel in the

experimental group. However, because of low reporting quality and differences between the studies, these results should be interpreted with caution.
- A clear delineation of the effectiveness of the intervention cannot be resolved from this review
- Future research should concentrate on developing study protocols that are scientifically sound regarding randomization, blinding, allocation concealment and other factors to minimize bias.

Reviewer Comments:

Four trials reported industrial sponsorship.

The authors note the following limitations:

- *Scarcity of high quality studies*
- *Possible that unpublished, non-significant trials exist (even though they were not found in this review)*
- *No quantitative synthesis could be performed due to differences between the studies (e.g., study designs, population characteristics, intervention characteristics, case definition and primary outcome measure)*
- *Only one reviewer was used to do the broad screen and review the two citations identified after September 2003. This may have introduced bias.*

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions		
1.	Will the answer if true, have a direct bearing on the health of patients?	Yes
2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes
4.	Will the information, if true, require a change in practice?	Yes

Validity Questions		
1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search termsused described?	Yes
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	???
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	Yes

5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	No
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issued considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	Yes